

Rotifers Diversity of Gorja Lake of Bhadrawati, District Chandrapur (M.S.), India

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Abstract

Rotifers are small soft body, microscopic, freshwater invertebrates and important connecting link organism between primary producers and consumers in an aquatic ecosystem. Rotifers are residing in an inland water bodies and their diversity refers to varieties of species within their community. Present Rotifers in the Gorja Lake near the Bhadrawati town was studied from June 2014 to May 2016 during total 22 species of Rotifers were recorded in three sites of Gorja Lake.

KEYWORDS: Gorja lake, Rotifer, Diversity.

INTRODUCTION

Rotifers are a group of Zooplankton occurs almost everywhere in an aquatic ecosystem of the world. The abundance of Rotifers are more or less they depend of physical, chemical and biological properties of lake waters and also is related to the suitable conditions for their survival in the lake.

Zooplanktonic rotifers have a very short life cycle and under favorable conditions of temperature, food photoperiod and also Rotifers have short reproductive stages they rapidly increases in abundance rotifers under favorable environmental condition (Dhanapathi, 2000). This group not only forms an integral part of the aquatic food chain but it is also important linked between the non-plankton and carnivorous Zooplankton (Neveset.al., 2003).

In present investigation, the Gorja Lake is principal fresh water body located in Gorja village of Bhadrawati tahsil in Chandrapur district of Maharashtra state. Bhadrawati is a tahsil place and it is 25 km north side of Chandrapur and 125 km south east side from Nagpur. It is situated at about 211 m above the mean sea level and it is at 20°06'35.67" N is latitude and 79°07'7.33" E longitude.

Gorja lake is 10 km south side from Bhadrawati tahsil at about 198 m above mean sea level and is at 79°05'48" E longitude and 20°05'59" N latitude. Gorja lake receives the water from the surrounding catchment areas during the monsoon period. The area of Gorja Lake is spread over 300 acres. The depth of water is 35 feet during the monsoon and 12 feet during the summer season. The water of this lake is primary used for washing, bathing fishing activities, agriculture and other domestic purpose but now it is at a transitional state with respect to degradation.

MATERIAL AND METHODS

Sample for planktonic study were collected monthly from three site of lake. The samples were collected in the morning hours between 8.30 a.m. to 10.30 a.m. 50

Lt. of water sample was filtrated through the plankton net made of bolting silk number 25 with mesh size 64 lime the collected samples were allowed to settle down by adding Lugol's Iodine. Normally sedimentation requires 24 hrs. after which supernatant was removed and concentrate was made up to 50 ml. depending the number of plankton and preserved in 5% formalin for further studies.

For the quantitative study the concentrated sample was shaken and immediately one drop of sample was taken on a clear micro side with the help of standard dropper the whole drop was then carefully covered with the cover glass and observed. Plankton identification up to genera and whenever possible upto species level was classified according to keys given by Prescott (1954), Edmonsonic (1959), Sehgal (1983), Adoni (1985), and APHA (1985) and standard analysis was undertaken as per Zar (2005).

Quantitative study of plankton was done by Sedgwick – Rafter cell method

Sedgwick – Rafter Cell Method

The Sedgwick – Rafter cell is a special kind of slide similar to the Haemocytometer. The cell has a 50 mm x 20 mm x 10 mm rectangular cavity that holds 1 ml. sample. The cell is moved in horizontal direction on the stage of an inverted microscope and plankton species encountered in the field are enumerated. A number of replicate samples are enumerated to calculate plankton/lit.

Plankton (units/lit) = $n \times C/V$

Where, n = number of plankton in 1ml

C = Volume of Concentrate

V = Volume of sample in lit.

RESULT AND DISCUSSION

The taxonomic dominance of rotifers were observed by researchers, Sampaio, *et.al.*, (2002), Neves, *et.al.*, (2003). Bhagat, *et.al.*, (2010) observed 29 species belong to rotifers in Ambadi irrigation dam District Akola. ShashikantR.Sitre and Mahendra G. Thakare (2013) they have observed that the most abundant species were represented by rotifer in Balaji temple tank of Chimur city of Chandrapur District (M.S.), Hemlata Verma, *et.al.*, (2013) reported that the rotifers were the most abundant throughout the study period in Futera pond, Damoh District (M.P.), Gunwant P. Gadekar (2014) observed the maximum species richness were observed in group rotifers in Pangdi lake of Gondia, District Gondia (M.S.) and Gajanan Sontakke and Satish Mokashe (2014) observed rotifers was dominant with 11 species in Dekhu reservoir from Aurangabad (M.S.).

In the present investigation rotifers are represented by 22 species at all the sampling three sites of lake. It showed little species diversity as per sampling sites at the respective lake. In site A, rotifers are represented by 22 species in 2014-15 and 21 species in 2015-16. In site B, rotifers are represented by 22 species in 2014-15 and 21 species in 2015-16 and in site C, rotifers are represented by 22 species in 2014-15 and 20 species in 2015-16.

In the site A, during 2014-15, 22 species were recorded among which *Cephalodella gibba* (96 no./lit) is dominant followed by *Brachionus bidentata* (64 no./lit), *Brachionus calyciflorus* (64 no./lit), *Brachionus falcatus* (64 no./lit), *Brachionus forficula* (56 no./lit), *Filina opoliensis* (50 no./lit), *Horaella brehmi* (50 no./lit), *Brachionus plicatilis* (48 no./lit), *Rotaria rotatoria* (45 no./lit), *Testudinella macroneta* (45 no./lit), *Philodina roseola* (42 no./lit), *Asplanchna intermedia* (40 no./lit), *Platyias quadricornis* (39 no./lit), *Lecane luna* (37 no./lit), *Monostyle bulla* (35 no./lit), *Brachionus quadridentatus* (34 no./lit), *Filinia longiseta* (26 no./lit), *Rotaria neptunia* (17 no./lit), *Trichocerca rattus* (15 no./lit), *Trichocera similes* (13 no./lit), *Keratella valga* (10 no./lit) and *Platyias patulus* (10 no./lit).

In the site A, during 2015-16, 21 species were recorded among which *Cephalodella gibba* (73 no./lit) is dominant followed by *Brachionus bidentata* (60 no./lit), *Brachionus forficula* (56 no./lit), *Keratella valga* (48 no./lit), *Filinia opoliensis* (46 no./lit), *Brachionus falcatus* (43 no./lit), *Rotaria rotatoria* (43 no./lit), *Testudinella macroneta* (42 no./lit), *Brachionus plicatilis* (41 no./lit), *Platyias quadricornis* (39 no./lit), *Asplanchna intermedia* (36 no./lit), *Lecane luna* (33 no./lit), *Trichocerca tigris* (32 no./lit), *Brachionus quadridentatus* (31 no./lit), *Philodina roseola* (27 no./lit), *Monostyle bulla* (25 no./lit), *Filinia longiseta* (24 no./lit), *Rotaria neptunia* (16 no./lit), *Trichocerca rattus* (14 no./lit), *Horaella brehmi* (12 no./lit) and *Platyias patulus* (11 no./lit).

In site B, during 2014 -15, 22 species were recorded among which *Cephalodella gibba* (83 no./lit) is dominant followed by *Horaella brehmi* (71 no./lit), *Brachionus calyciflorus* (59 no./lit), *Brachionus bidentata* (57 no./lit), *Brachionus forficula* (55 no./lit), *Brachionus falcatus* (52 no./lit), *Filinia opoliensis* (48 no./lit), *Brachionus plicatilis* (44 no./lit), *Asplanchna intermedia* (41 no./lit), *Testudinella macroneta* (41 no./lit), *Philodina roseola* (40 no./lit), *Platyias quadricornis* (37 no./lit), *Rotaria rotatoria* (35 no./lit), *Brachionus quadridentatus* (33 no./lit), *Lecane luna* (33 no./lit), *Monostyle bulla* (32 no./lit), *Filinia longiseta* (25 no./lit), *Rotaria neptunia* (16 no./lit), *Trichocerca rattus* (15 no./lit), *Trichocera similes* (11 no./lit), *Keratella valga* (10 no./lit) and *Platyias patulus* (10 no./lit).

In site B, during 2015 -16, 21 species were recorded among which *Cephalodella gibba* (80 no./lit) is dominant followed by *Brachionus bidentata* (55 no./lit), *Brachionus forficula* (52 no./lit), *Horaella brehmi* (48 no./lit), *Brachionus falcatus* (47 no./lit), *Brachionus plicatilis* (44 no./lit), *Filinia opoliensis* (44 no./lit), *Rotaria rotatoria* (43 no./lit), *Testudinella macroneta* (41 no./lit), *Asplanchna intermedia* (40 no./lit), *Philodina roseola* (39 no./lit), *Platyias quadricornis* (37 no./lit), *Lecane luna* (35 no./lit), *Monostyle bulla* (34 no./lit), *Brachionus quadridentatus* (32 no./lit), *Trichocerca tigris* (32 no./lit), *Filinia longiseta* (25 no./lit), *Rotaria neptunia* (16 no./lit), *Trichocerca rattus* (14 no./lit), *Platyias patulus* (11 no./lit) and *Keratella valga* (9 no./lit).

In site C, during 2014-15, 22 species were recorded among which *Cephalodella gibba* (78 no./lit) is dominant followed by *Brachionus falcatus* (62 no./lit), *Brachionus calyciflorus* (60 no./lit), *Brachionus forficula* (58 no./lit), *Brachionus bidentata* (52 no./lit), *Horaella brehmi* (49 no./lit), *Filinia opoliensis* (46 no./lit), *Philodina roseola* (45 no./lit), *Brachionus plicatilis* (40 no./lit), *Testudinella macroneta* (36 no./lit), *Asplanchna intermedia* (35 no./lit), *Brachionus quadridentatus* (35 no./lit), *Lecane luna* (35 no./lit), *Rotaria rotatoria* (32 no./lit), *Monostyle bulla*

(30 no./lit), *Platyias quadricornis* (28 no./lit), *Filinia longiseta* (21 no./lit), *Rotaria neptunia* (15 no./lit), *Trichocerca rattus* (14 no./lit), *Trichocera similes* (10 no./lit), *Keratella valga* (9 no./lit) and *Platyia spatulus* (9 no./lit).

In site C, during 2015-16, 20 species were recorded among which *Cephalodella gibba* (76 no./lit) is dominant followed by *Keratella valga* (58 no./lit), *Brachionus bidentata* (55 no./lit), *Brachionus forficula* (54 no./lit), *Brachionus falcatus* (47 no./lit), *Filinia opoliensis* (44 no./lit), *Rotaria ratatoria* (43 no./lit), *Testudinella macroneta* (41 no./lit), *Brachionus plicatilis* (39 no./lit), *Asplanchna intermedia* (37 no./lit), *Platyias quadricornis* (35 no./lit), *Lecane luna* (33 no./lit), *Monostyla bulla* (33 no./lit), *Brachionus quadridentatus* (32 no./lit), *Philodina roseola* (27 no./lit), *Filinia longiseta* (23 no./lit), *Rotaria neptunia* (13 no./lit), *Horaella brehmi* (12 no./lit), *Trichocerca rattus* (12 no./lit) and *platyias patulus* (11 no./lit).

Among the different species of Rotifers in site A, *Cephalodella gibba* was dominant followed by *Brachionus bidentata*, *Brachionus calyciflorus*, *Brachionus falcatus*, *Brachionus forficula*, *Filinia opoliensis*, *Horaella brehmi* and *Brachionus plicatilis*. In site B, *Cephalodella gibba* was dominant followed by *Haraella brehmi*, *Brachionus calyciflorus*, *Brachionus bidentata*, *Brachionus forficula*, *Brachionus falcatus* and *Filinia opoliensis* and in site C. *Cephalodella gibba* was dominant followed by *Brachionus falcatus*, *Brachionus calyciflorus*, *Brachionus forficula*, *Keratella valga* and *Brachionus bidentata*.

In the present investigation dominance of rotifers as a group as well as *cephlodella gibba* in site A, B, and C indicates eutrophic nature of the Gorja Lake. During present investigation the rotifers were maximum during the winter season in site A and site C and minimum during the monsoon season in site C of the Gorja Lake. Rotifers consume more nutrients rapidly to build up their population (Saboor and Altaf, 1995). Kedar, (2007) recorded maximum Rotifers during the March and minimum during July. Nirmal Kumar, J.I. *et.al.*, (2011) observed maximum population of rotifers during the summer season and minimum during the monsoon season of Varasda wetland system. Goswami, A.P. and Mankodi, P.C. (2012) reported rotifers were higher in winter in fresh water reservoir Nyari –II Rajkot district, Gujarat. M.R. Abdar (2013) founded maximum density of rotifer is recorded during post monsoon months and minimum during rainy season. Jaiswal, D.P. *et.al.*, (2014) observed maximum population density of rotifers were observed during summer season while minimum during in monsoon season in a freshwater Rangavali Dam of Navapur of District Nandurbar. Gunwant P. Gadekar (2014) in his study noted that the population density of rotifers were maximum in winter, in December month and minimum in monsoon season, in June month in Pangdi Lake of Gondia, District Gondia, (M.S.) and Shashikant R. Sitre (2014) reported rotifers were minimum in monsoon season in Naik lake of Nagpur city (M.S.). Isainarasu, *et.al.*, (1995) reported 11 species of rotifers in pond of Sivakashi, Tamilnadu. Kamble and Meshram (2005) founded 5 species of rotifers in Khatijapur tank of Achalpur, Amraoti (M.S.), Pawar and Pulle (2005) observed 28 species of rotifers in Petwadaj dam of Nanded (M.S.), Sahoo, S. and Jameson, J.D. (2006) reported twenty five species of rotifers in a fish pond in Thothukudi, Tamilnadu. Jayabhaye and Madalapore (2006) reported 14 species of rotifers in Parola dam of Hingoli (M.S.), Sakhre and Joshi (2006) have observed 8 species of rotifers in Yeldari reservoir. Sharma, *et.al.*, (2007) noted twenty

eight species of rotifers in and around Udaipur city, Rajasthan. Chargan, *et.al.*, (2008) founded 7 species of rotifers in freshwater wetlands of Yeotmal district of (M.S.), Balakrishna, D. *et.al.*, (2013) observed the four major groups 10 species of rotifers in Dharmasagar lake is located in village and Mandal of Dharamsagar in Warangal district, Andhra Pradesh. M. Jeelani and H. Kaur (2014) observed 27 species of rotifer in Dal lake, Kashmir. Shashikant R. Sitre (2014) reported nine species of rotifers in Naik lake of Nagpur city (M.S.) and Gajanan Sontakke and Satish Mokashe (2014) observed 11 species of the rotifers in Dekhu reservoir from Aurangabad, Maharashtra.

CONCLUSION

In the present investigation, the maximum rotifers during the winter season is probably due to availability of suitable food and favorable temperature and minimum density in monsoon season which could be due to dilution of water resulting in fewer nutrients and due to reduction of transparency and dissolved oxygen.

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Table 1: Yearly variation of Rotifers from sites of Gorja Lake during year 2014-15

S.N.	Parameters	A	B	C	Total
1	Rotifers	74.75 ± 35.88	70.67 ± 33.35	66.58 ± 30.19	70.67 ± 2.33

Table 2: Yearly variation of Rotifers from sites of Gorja Lake during year 2015-16

S.N.	Parameters	A	B	C	Total
2	Rotifers	62.67 ± 34.47	64.83 ± 37.30	60.42 ± 30.95	62.64 ± 2.60

Table 3: Two Yearly variation of Rotifers from sites of Gorja Lake during year 2014-16

S.N.	Parameters	A	B	C	Total
3	Rotifers	68.71 ± 34.81	67.75 ± 34.88	63.50 ± 30.09	66.65 ± 2.24